

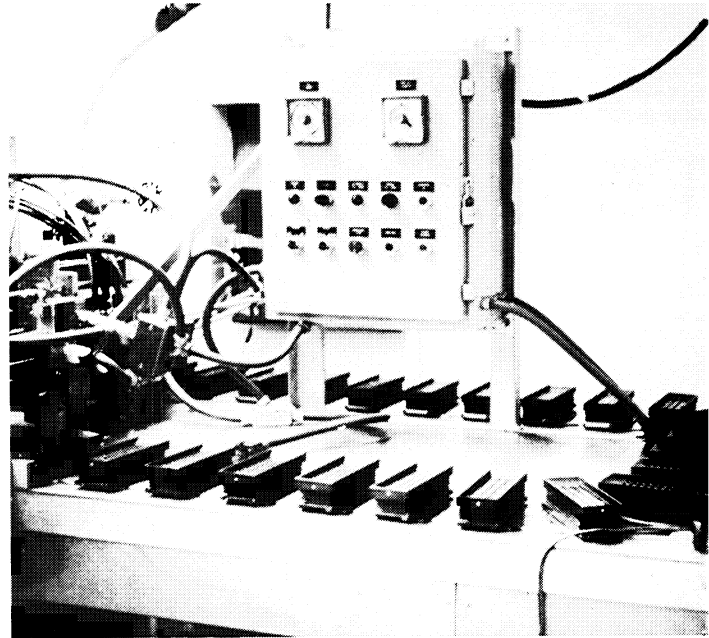
## Protective Coatings

The machine pictured below is used in the pharmaceutical industry for high-speed pressing of pills and capsules. At right is an automatic system for molding glycerine suppositories. These machines are typical of many types of drug production and packaging equipment whose metal parts are treated with space spinoff coatings that promote general machine efficiency and contribute to compliance with stringent federal sanitation codes for pharmaceutical manufacture. Collectively known as "synergistic" coatings, these dry lubricants are bonded to a variety of metals to form an extremely hard, slippery surface with long-lasting self-lubrication. Essentially, they combine the best characteristics of other surface treatment materials and processes to produce an entirely new material superior to the metallic base to which they are applied.

The coatings offer multiple advantages: they cannot chip, peel or be rubbed off; they protect machine

parts from corrosion and wear longer, lowering maintenance costs; and they reduce undesired heat caused by power-robbing friction. Synergistic coatings are especially useful in the drug industry because they do not react with or contaminate the substances being processed, they are easily cleaned, they prevent production interruptions and the hard, non-porous surface they create blocks formation of bacteria pockets.

Synergistic coatings resulted from the unique treatment requirements of new, lightweight metals — titanium and magnesium for instance — used in spacecraft construction for greater strength at reduced weight. Under NASA contract, General Magnaplate Corporation, Linden, New Jersey, developed a quality control program and handbook for Apollo spacecraft hardware. During this work, the company reported that conventional lubrication processes would not suffice for the relatively soft new metals, because the lubricants would boil away in the



vacuum of space, leaving the surfaces unprotected. General Magnaplate subsequently developed processes for bonding various dry lubricants to space metals; not susceptible to boiloff, the lubricants prevented wear and abrasion and offered additional advantages in easier fabrication of spacecraft parts. They were applied to many components of such spacecraft as Apollo, Skylab, the Viking Mars Landers and the Space Shuttle.

Although the General Magnaplate family of coatings has special applicability in pharmaceutical manufacture, commercial use is much broader. The coatings are used on machinery employed in manufacture of several hundred household products, on food processing machinery, computers, turbines, pumps, valves and a great variety of other equipment. General Magnaplate's lengthy list of customers includes many of the nation's leading industrial firms and coating sales run into millions of dollars annually.